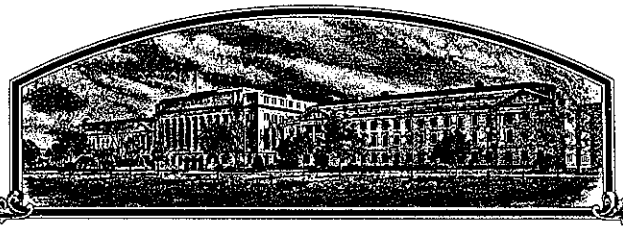

No. 8800033

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Kansas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, (THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM,* TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS REQUIRED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

(*Waived, except that this waiver shall not apply to breeder seed, foundation seed, labeling requirements, and blending limitations.)

WHEAT

'Norkan'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 28th day of February in the year of our Lord one thousand nine hundred and eighty-nine.

Attest:

Kenneth A. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Clayton Yeutter

Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION	3. VARIETY NAME
Kansas Agricultural Expt. Station	KS82H4	Norkan

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*	5. PHONE *(Include area code)*	FOR OFFICIAL USE ONLY
Waters Hall Kansas State University Manhattan, KS 66506	(913) 532-6147	PVPO NUMBER 8800033

6. GENUS AND SPECIES NAME	7. FAMILY NAME *(Botanical)*	FILING
Triticum aestivum	Gramineae	DATE: December 15 1987 TIME: 1:30 ☐ A.M. ☑ P.M.

8. KIND NAME	9. DATE OF DETERMINATION	FEES RECEIVED
Wheat	3/11/87	AMOUNT FOR FILING: $ 1800 00 DATE: November 30 1987 AMOUNT FOR CERTIFICATE: $ 200 00 DATE: Dec. 5, 1988

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*

University

11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Vernon A. Schaffer, Agronomy Department, Throckmorton Hall,
Kansas State University, Manhattan, KS 66506

PHONE *(Include area code)*: (913) 532-6115

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☒ Yes *(If "Yes," answer items 16 and 17 below)* ☐ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ Yes ☐ No	☒ Foundation ☒ Registered ☒ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ Yes *(If "Yes," give date)*
☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES ?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT	DATE
Kurt C. Feltner Assoc. Dir. Research Experiment Station Kurt C. Feltner	NOV. 23, 1987
SIGNATURE OF APPLICANT	DATE

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

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Exhibit A. Origin and Breeding History of Norkan Wheat

Norkan was selected from the cross Plainsman V/3/2 *(KS76H3705) Larned/Eagle//Sage which was made by the late Dr. R. W. Livers at Hays, Kansas, the winter of 1976-77.

The pedigree method of breeding was used. Early generation selection and subsequent increases were grown at Hays. Single plant selections were made from the space planted F_2 and grown as F_3 plant rows in 1980. Plant sections were made from desirable F_3 plant rows and planted as F_4 plant rows in 1981. Norkan is an increase of F_4 plant rows. The F_5 generation was grown in a 4x30 ft. increase plot in 1982. The plot was rogued extensively and the two center six rows were harvested for pure seed increase. An 8x30 ft. plot was grown in 1983, from which only the center six rows were harvested. A one-tenth acre block was produced in 1984, which was rogued heavily; however, few off-types were found. One acre was planted in 1985 in which five red chaffed semidwarfs and six standard height white chaffed plants were found and removed. Seed from the 1985 increase was used to produce Foundation seed. Three acres of the 1986 production field were rogued heavily seven times compared to twice for the remainder of the field. Seed from this three acres was harvested, kept separate, and used as breeder's seed to plant 100 acres for Foundation seed production in 1987.

Wheat Application No. 8800033 'Norkan'

Exhibit A Paragraph 3 and 4 Addition

Norkan breeder seed was first multiplied in intensively rogued seed blocks.

Norkan is uniform. Variants are limited to taller than average plants which occur at a frequency of less than 1 in 15,000. The variates as well as typical plants are predictable and commercially acceptable.

Norkan is stable. When sexually reproduced, the variety remains unchanged in its essential and distinctive characteristics.

Exhibit B. Norkan Novelty Statement

Norkan wheat is most similar to Larned wheat. Norkan differs from Larned in the following characteristics:

1. Norkan is resistant to wheat soil borne mosaic virus, whereas Larned is susceptible. (App. A, Table 13)
2. Norkan plants are shorter statured than Larned plants. (App. A, Table 11)
3. Coleoptile length of Norkan is shorter than Larned. (App. B, Table 14)

Table 11. Plant heights (inches) from 1987 Kansas Wheat Performance Tests.

Brand	Variety or Hybrid	COUNTY												
		BROWN	RILEY	ELLIS	REPU-BLIC	HAR-VEY	RENO	STAFFORD DRY.	STAFFORD IRR.	THOMAS DRY.	THOMAS IRR.	GREELEY DRY.	FINNEY IRR.	12-Sta. Avg.
AgriPro	Victory	36	37	35	39	29	32	34	33	35	41	30	37	34.8
AgriPro	Thunderbird	38	39	40	42	30	34	38	36	37	43	33	40	37.5
AgriPro	Stallion	—	—	—	—	27	28	32	31	—	—	—	38	—
AgriPro	Trailblazer	35	36	—	38	29	32	—	—	—	—	—	—	—
AgriPro	Hawk	36	39	34	41	29	33	36	36	38	43	34	41	36.7
AgriPro	Mustang	33	36	34	37	27	30	31	30	—	—	31	38	—
AgriPro	Mesa	31	32	30	35	26	28	28	29	32	36	29	33	30.8
AgriPro	Abilene	32	35	33	37	26	29	31	34	35	38	30	37	33.1
Amer.Hyb.	AH 135	—	41	35	43	—	35	36	—	38	44	—	41	—
—	Arkan	35	38	35	42	29	34	33	36	37	41	31	37	35.7
Bounty	BH122	33	37	35	39	28	32	35	35	35	42	32	42	35.4
Bounty	BH205	38	40	38	42	32	36	38	39	37	44	33	40	38.1
Bounty	BH301	39	42	37	42	33	39	39	41	40	45	34	41	39.3
—	Brule	38	—	—	40	—	—	—	—	40	—	36	—	—
—	Carson	—	—	—	—	—	—	39	—	40	—	34	—	—
—	Centura	39	42	—	43	—	40	39	—	41	—	—	—	—
—	Century	34	37	35	40	28	32	32	37	38	44	36	40	36.1
—	Chisholm	—	—	—	—	27	31	32	32	—	—	—	39	—
—	Cody	—	—	37	44	—	—	—	—	40	47	38	—	—
—	Colt	33	35	31	37	—	—	32	35	34	38	30	—	—
—	Dodge	35	37	35	39	29	32	32	33	33	39	30	38	34.3
—	Larned	39	44	42	42	34	42	42	—	41	—	37	—	—
—	Newton	37	40	36	41	30	34	34	36	37	43	32	40	36.7
—	Norkan	38	38	35	41	29	35	34	38	37	41	32	38	36.3
Pioneer	2157	34	35	33	38	27	30	33	35	—	—	—	—	—
Quantum	XH552 Exp	—	—	—	—	30	32	—	—	—	—	—	—	—
Quantum	XH436 Exp	—	—	—	—	—	—	—	—	—	37	—	37	—
Quantum	XH699 Exp	—	—	—	—	—	—	—	—	—	36	—	37	—
Quantum	XH140A Exp	—	—	35	—	—	—	—	—	38	42	34	—	—

(continued)

Appendix A, Table 11 (extracted from Table 11 of Kansas State University Agricultural Experiment Station "Report of Progress No. 526," Aug. 1987, submitted as Appendix A to Plant Variety Protection Application No. 8800033)

8800033

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Table 11. Plant heights (inches) from 1987 Kansas Wheat Performance Tests (continued).

Brand	Variety or Hybrid	COUNTY BROWN	RILEY	ELLIS	REPU-BLIC	HAR-VEY	RENO	STAFFORD DRY.	STAFFORD IRR.	THOMAS DRY.	THOMAS IRR.	GREELEY DRY.	FINNEY IRR.	12-Sta. Avg.
—	Redland	38	—	—	41	—	—	—	—	40	—	37	—	—
RHS	7837	34	36	34	39	28	31	33	34	35	40	32	39	34.6
RHS	7833	—	—	34	—	—	—	—	—	36	41	31	38	—
RHS	830	—	38	—	39	—	36	—	—	—	—	—	—	—
RHS	7846	34	38	35	40	28	32	30	33	37	42	33	40	35.2
RHS	7805	—	—	35	41	—	—	36	—	40	43	34	40	—
Hybrex	8604 Exp	36	38	—	—	30	34	—	—	—	—	—	—	—
—	Sandy	—	—	—	—	—	—	41	—	—	—	39	—	—
—	Scout 66	40	44	44	45	36	42	42	—	42	—	40	—	—
Seed Res.	5630	—	—	—	—	—	30	—	—	—	—	—	—	—
—	Siouxland	39	43	42	43	34	41	40	40	42	46	40	44	41.2
—	TAM 105	35	38	34	40	—	—	35	38	—	—	32	39	—
—	TAM 107	34	36	33	40	27	31	34	34	36	41	32	38	34.7
—	TAM 108	34	37	34	40	28	34	36	36	36	40	32	38	35.4
—	Triumph 64	—	—	—	—	—	38	—	—	—	—	—	—	—
—	Vona	—	—	33	39	—	—	31	34	37	40	33	37	—
—	Becker (S)	32	35	—	—	—	—	—	—	—	—	—	—	—
—	Caldwell (S)	36	39	—	—	—	—	—	38	—	—	—	—	—
—	Compton (S)	—	37	—	—	—	—	—	—	—	—	—	—	—
—	Pike (S)	—	39	—	—	—	—	—	37	—	—	—	—	—
—	KS831374 Exp	33	36	34	39	28	31	33	34	35	40	31	37	34.3
—	KS84HW196 Exp	—	—	33	—	—	—	—	—	34	38	30	37	—
—	TAM 200	—	—	33	—	—	30	32	31	—	—	—	35	—
Test averages, inches		36	38	35	40	29	33	35	35	37	41	33	38	—
L.S.D. (.05) **		1.8	2.1	2.1	1.6	1.8	2.1	1.8	1.7	2.3	1.7	2.0	2.0	

** Unless two varieties differ by more than the L.S.D. (least significant difference), little confidence can be placed in one being superior to the other.

Appendix A, Table 13 (extracted from Table 13 of Kansas State University Agricultural Experiment Station "Report of Progress No. 526," Aug. 1987, submitted as Appendix A to Plant Variety Protection Application No. 8800033)

Table 13. Coleoptile length, Hessian fly ratings, and disease notes from 1987 Kansas Wheat Performance Tests.

Brand	Variety or Hybrid	Coleoptile (sprout) length	Hessian fly score	Soil-borne mosaic rating	Leaf rust notes			Tan spot	Leaf greenness	
					Riley	Ellis	Thomas Irr.	Riley	Reno	Riley
		1/	2/	3/	4/	5/	6/	7/	8/	9/
AgriPro	Victory	89	S	0	tr	1	14	5	3	3.3
AgriPro	Thunderbird	106	S	0	4	5	3	6	4	3.0
AgriPro	Stallion	89	S	---	---	---	---	---	4	---
AgriPro	Trailblazer	90	S	0	38	---	---	7	4	4.0
AgriPro	Hawk	79	S	0	53	75	24	8	4	4.8
AgriPro	Mustang	76	S	0	49	75	---	9	4	4.8
AgriPro	Mesa	77	S	0	14	5	8	9	5	4.3
AgriPro	Abilene	82	S	0	11	33	9	7	4	3.3
Amer.Hyb.	AH 135	94	S	---	18	1	3	5	3	3.0
----	Arkan	119	R	0	30	13	4	7	4	3.8
Bounty	BH122	80	S	7	34	75	15	8	4	4.0
Bounty	BH205	85	S	4	8	5	16	4	2	3.0
Bounty	BH301	84	S	4	2	1	8	8	2	3.5
----	Brule	75	R	4	---	---	---	---	---	---
----	Carson	113	S	---	---	---	---	---	---	---
----	Centura	99	H	3	13	---	---	8	4	4.0
----	Century	85	H	5	15	40	8	5	3	3.8
----	Chisholm	81	S	---	---	---	---	---	4	---
----	Cody	98	S	---	---	8	8	---	---	---
----	Colt	85	H	2	28	63	21	8	---	4.3
----	Dodge	93	S	0	30	63	14	9	5	4.8
----	Larned	111	R	7	33	75	---	8	4	5.0
----	Newton	87	S	0	39	75	24	8	4	4.5
----	Norkan	84	R	0	43	75	13	9	5	5.0
Pioneer	2157	86	R	0	18	3	---	8	4	3.5
Quantum	XH552 Exp	92	S	---	---	---	---	---	3	---
Quantum	XH436 Exp	75	S	---	---	---	23	---	---	---
Quantum	XH699 Exp	77	S	---	---	---	16	---	---	---
Quantum	XH140A Exp	80	S	---	---	5	14	---	---	---
----	Redland	75	H	2	---	---	---	---	---	---
RHS	7837	79	S	1	tr	1	4	7	3	3.8
RHS	7833	74	S	---	---	50	20	---	---	---
RHS	830	91	S	---	15	---	---	4	2	2.8
RHS	7846	78	H	0	9	1	14	7	3	3.8
RHS	7805	93	S	---	---	10	4	---	---	---
Hybrex	8604 Exp	83	S	1	10	---	---	8	3	3.8
----	Sandy	90	S							
----	Scout 66	112	S	5	39	75	---	8	4	4.8
Seed Res.	5630	91	S	---	---	---	---	---	4	---
----	Siouxland	100	S	3	6	3	tr	6	2	2.5

(continued)

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Table 13. Coleoptile length, Hessian fly ratings, and disease notes from 1987 Kansas Wheat Performance Tests (continued).

Brand	Variety or Hybrid	Coleoptile (sprout) length	Hessian fly score	Soilborne mosaic rating	Leaf rust notes			Tan spot	Leaf greenness	
					Riley	Ellis	Thomas Irr.	Riley	Reno	Riley
		1/	2/	3/	4/	5/	6/	7/	8/	9/
----	TAM 105	87	S	2	59	75	---	9	---	5.0
----	TAM 107	100	S	6	40	75	31	9	5	5.0
----	TAM 108	79	S	0	26	50	25	7	4	4.5
----	Triumph 64	97	S	---	---	---	---	---	4	---
----	Vona	71	S	---	---	53	26	---	---	---
----	Becker (S)	78	R	0	18	---	---	8	---	3.3
----	Caldwell (S)	80	R	1	13	---	---	3	---	2.8
----	Compton (S)	82	R	---	9	---	---	2	---	2.5
----	Pike (S)	102	R	---	24	---	---	5	---	3.5
----	KS831374 Exp	86	S	0	16	5	16	3	3	2.8
----	KS84HW196 Exp	98	S	---	---	63	24	---	---	---
----	TAM 200	80	S	---	---	3	---	---	3	---
Test averages		---	-	2	22	35	14	7	3	3.8
L.S.D. (.05)	**	---	-	2.3	11.0	16.6	5.2	---	0.7	---

1/ Coleoptile lengths given as percent of the old standard variety, Eagle. Data provided by T. Joe Martin, Ft. Hays Exp. Station.
2/ Hessian fly ratings from greenhouse tests by J. H. Hatchett, Manhattan, using the Great Plains biotype. S = susceptible; H = heterogeneous (both resistant and susceptible plants in sample); R = resistant.
3/ Soilborne mosaic virus readings from Brown County; rated from 1 to 9, where 0 = no symptoms.
4/ Leaf rust readings 5/25 by William Willis; percent of flag leaves covered by pustules.
5/ Leaf rust readings 6/3 by T. Joe Martin; percent of flag leaves covered by pustules.
6/ Leaf rust readings 6/10 by William Willis; percent of flag leaves covered by pustules. Infection probably not severe enough for good separation of levels of resistance.
7/ Tan spot readings by Rollie Sears; rated from 1 to 9, where 1 = best.
8/ Greenness readings May 26 by William Willis; 1 = flag leaf green, 5 = flag leaf dead and rolled. Premature leaf death caused by leaf rust, tan spot, and drouth.
9/ Green leaf readings by Rollie Sears; 1 = best.

** Unless two varieties differ by more than the L.S.D. (least significant difference), little confidence can be placed in one being superior to the other.

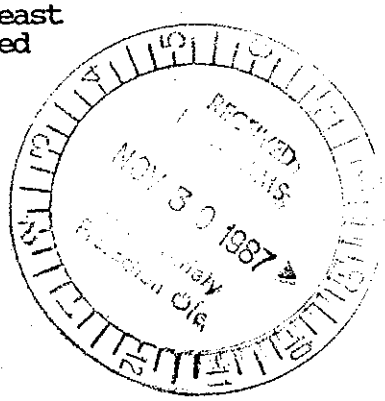

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Table 14. Relative coleoptile lengths, winter survival, rusts, shattering notes, and Hessian fly ratings from 1986 Kansas Wheat Performance Tests.

Brand	Variety or Hybrid	Coleoptile (sprout) length 1/	Winter survival %		Soilborne mosaic ratings 4/	Leaf rust ratings 5/				Stem rust ratings 6/			Shattering % 7/	Hessian fly ratings 8/
			Brown 2/	Labette 3/		Riley	Harvey	Republic	Reno	Riley	Harvey	Republic		
AGC	101	93	19	65	1.0	100 S	40	39	100 S	7	6	3.8	1	S
AGC	102	93	24	66	1.0	90 S	46	38	90 S	7	5	3.3	1	S
AgriPro	Victory	86	29	73	1.0	10 MR	14	6	10 MR	6	3	0	1	S
AgriPro	Mustang	76	5	58	1.0	100 S	91	55	100 S	5	0	0	1	S
AgriPro	Thunderbird	102	24	89	1.0	tr MR	4	15	tr MS	7	0	0	1	S
AgriPro	Stallion	86	9	66	1.3	80 S	--	--	90 S	9	-	-	1	S
AgriPro	Wrangler	72	18	89	1.0	100 S	100	55	100 S	4	0	0	0	S
AgriPro	Ram	81	--	--	---	--	--	--	--	-	-	-	-	S
---	Arkan	111	16	63	1.5	10 S	25	30	10 S	2	0	0	2	R
Bounty	BH202 (H)	77	3	25	1.8	80 S	53	55	90 S	4	0	0	0	S
Bounty	BH205 (H)	88	18	65	2.5	30 S	38	51	30 S	3	0	0	1	S
Bounty	BH301 (H)	89	8	70	2.5	10 MS	9	20	10 MS	7	0	0	1	S
Bounty	BH122 (H)	85	13	74	3.8	60 S	36	48	70 S	4	0	0	0	S
---	Brule	79	23	--	3.3	--	--	38	--	-	-	0	1	R
---	Redland	77	24	--	4.0	--	--	38	--	-	-	0	0	R
---	Centura	95	34	--	---	30 MS	--	14	20 MR-MS	3	-	0	1	S
---	Centurk 78	99	15	--	---	70 S	--	39	70 S	3	-	0	0	S
---	Chisholm	78	--	48	4.5	--	45	--	100 S	-	7	-	1	H
---	Colt	84	30	--	4.5	60 S	--	43	--	3	-	0	0	H
Garst	HR-48	76	5	50	1.0	100 S	68	65	100 S	4	1	0	0	S
Garst	HR-64	70	25	68	1.3	100 S	59	74	100 S	5	1	0	0	H
---	Norkan	85	29	45	1.0	20 S	24	36	20 S	2	0	0	1	R
---	Dodge	94	18	64	1.5	20 S	25	33	20 S	5	1	0.3	0	S
---	KS831957 Exp	99	35	58	1.0	50 S	31	34	50 S	9	8	6.5	0	H
---	Larned	114	33	73	---	80 S	36	53	80 S	5	2	0.3	1	R
---	Newton	88	18	53	1.5	100 S	74	59	100 S	5	1	0	0	S
---	Century	83	14	39	4.5	tr MR	11	23	tr MR	6	0	0	1	H
Quantum	XH509 Exp (H)	93	14	--	---	--	--	30	--	-	-	4.8	-	S
Quantum	XH499 Exp (H)	98	--	--	---	--	--	--	--	-	-	-	-	S
Quantum	XH140a Exp (H)	87	--	--	1.3	--	--	--	--	-	-	-	-	S
Quantum	XH478 Exp (H)	92	9	53	---	20 S	--	--	--	9	-	-	-	S
Quantum	XH500 Exp (H)	91	--	--	---	--	--	35	--	-	-	4.8	-	S
Quantum	XH431 Exp (H)	77	--	--	---	--	--	--	--	-	-	-	-	S
Quantum	XH477 Exp (H)	90	--	40	---	30 MS	--	--	--	9	-	-	-	S
Quantum	XH521 Exp (H)	94	--	--	---	--	21	--	40 S	-	6	-	-	S
Quantum	XH479 Exp (H)	92	--	--	1.3	--	21	--	30S-100S	-	8	-	-	S

(continued)

Appendix B, Table 14 (extracted from Table 14 of Kansas State University Agricultural Experiment Station "Report of Progress No. 505," Aug. 1986, submitted as Appendix B to Plant Variety Protection Application No. 8800033)

Table 14. Relative coleoptile lengths, winter survival, rusts, shattering notes, and Hessian fly ratings from 1986 Kansas Wheat Performance Tests.

Brand	Variety or Hybrid	Coleoptile (sprout) length 1/	Winter survival %		Soilborne mosaic ratings 4/	Leaf rust ratings 5/				Stem rust ratings 6/			Shattering % 7/	Hessian fly ratings 8/
			Brown 2/	Labette 3/		Riley	Harvey	Republic	Reno	Riley	Harvey	Republic		
RHS	830	91	10	55	4.0	20 S	29	34	15 S	5	0	0	0	S
RHS	Pony	95	14	51	4.8	10 S	26	29	10 S	3	0	0	0	S
RHS	7833	72	29	64	1.0	90 S	39	59	100 S	4	0	0	1	S
RHS	7837	82	13	59	1.5	5 MR	0	6	5 MR	3	0	0	1	S
—	Sandy	94	—	—	—	—	—	—	—	-	-	-	0	S
—	Scout 66	111	29	58	—	80 S	34	40	70 S	5	2	0	1	S
—	Siouxland	98	30	66	—	tr S	—	8	tr S	6	-	0.5	1	S
Super	T	97	—	—	—	—	—	45	—	-	-	0.3	-	S
Super	B	101	—	—	—	—	—	38	—	-	-	0	-	S
—	TAM 105	92	41	71	3.3	100 S	31	45	100 S	9	5	4.8	0	S
—	TAM 107	101	25	76	4.3	100 S	44	45	100 S	6	0	1.0	1	S
—	TAM 108	73	13	59	1.0	90 S	28	39	90 S	4	0	0	0	S
—	Triumph 64	100	—	71	—	—	—	—	70 S	-	-	-	-	S
—	Vona	70	—	45	4.5	—	40	36	—	-	6	1.8	0	H
—	Caldwell (S)	75	8	54	1.5	30 MS	—	—	—	5	-	-	-	-
—	Compton (S)	79	—	60	1.8	10 MR	—	—	—	9	-	-	-	-
—	Pike (S)	98	—	45	1.3	70 S	—	—	—	6	-	-	-	-
—	Becker (S)	74	8	78	—	70 S	—	—	—	9	-	-	-	-
RHS	McNair 1003 (S)	91	5	58	—	80 S	—	—	—	9	-	-	-	-
RHS	Coker 833 (S)	71	0	—	—	50 S	—	—	—	9	-	-	-	-
RHS	9227 (S)	72	0	—	—	60 S	—	—	—	8	-	-	-	-
RHS	9323 (S)	77	5	17	—	60 S	—	—	—	9	-	-	-	-

(S) = Soft red winter wheat varieties; remainder are hard red winter varieties or hybrids (H).

1/ Coleoptile lengths given as percent of the old standard variety, Eagle. Eagle had an average length of 100.1 millimeters, so above figures can be interpreted as percent of Eagle or actual coleoptile length in millimeters (25.4 mm = 1 inch). Data provided by Dr. T. J. Martin; fungicide-treated seed planted into vermiculite and germinated in the dark for 10 days at 65 F. Each entry replicated three times; L.S.D. = 5.9 mm.

2/ Fall stands satisfactory. Stands recorded as percent of fall stands that survived the winter. Warm January temperatures followed by severe late winter cold caused plant loss.

3/ Planting delayed by wet soil until Nov. 28. Winter mild, with less than normal snow; some freezing and thawing injury. Emergence irregular; some plants emerged during late winter and were killed by subsequent cold temperatures before stand notes were taken March 15.

4/ Soilborne mosaic readings from the Stafford Co.Irrigated test; 1 = no symptoms, 5 = severe symptoms.

5/ Leaf rust readings based on proportion of leaves covered by rust pustules (tr = trace), and a general rating of MR = moderately resistant, MS = moderately susceptible, or S = susceptible.

6/ Stem rust rated visually on a 1 to 9 scale, where 1 = good resistance and 9 = very heavy infection. Harvey County readings by Wm. Willis, Extension Plant Pathologist, K.S.U., at milk to soft dough stage. Riley County readings by Rollin Sears at hard dough stage. The Republic County readings were by Dr. Willis on June 3 (milk to soft dough stage).

7/ Shattering notes from Stafford County Dryland test just before harvest. Light shattering also noted in Stafford Co. Irrigated plots of Thunderbird and Arkan.

8/ Hessian fly ratings from greenhouse tests by J. H. Hatchett, USDA Entomologist, using the Great Plains biotype. S = susceptible, H = heterogeneous (both resistant and susceptible plants in sample), and R = resistant.

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVIC
LIVESTOCK, MEAT, GRAIN AND SEED DIVI
BELTSVILLE, MARYLAND 20785

Exhibit C
Objective Description
of the variety
Norkan Plant Variety
Protection

OBJECTIVE DESCRIPTION OF VARI

WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)

Dr. T. J. Martin

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)

Fort Hays Experiment Station
Hays, KS 67601

FOR OFFICIAL USE ONLY

PVPO NUMBER
8800033

VARIETY NAME OR TEMPORARY DESIGNATION
Norkan

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:

[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____

[2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

[2][3][2] FIRST FLOWERING

[2][3][7] LAST FLOWERING

4. MATURITY (*50% Flowering*):

[0][0] NO. OF DAYS *EARLIER* THAN .....

[ ][ ] NO. OF DAYS *LATER* THAN .....

[2] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (*From soil level to top of head*):

[0][8][6] CM. HIGH

[ ][ ] CM. TALLER THAN .....

[1][4] CM. SHORTER THAN .....

[2] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):

[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][4] NO. OF NODES (*Originating from node above ground*)

[2][4] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____

[1] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[1][0] MM. LEAF WIDTH (*First leaf below flag leaf*)

[2][0] CM. LEAF LENGTH (*First leaf below flag leaf*):

8800033

11. HEAD:

2 [1] Density: 1 = LAX 2 = DENSE "MID-DENSE"

[1] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER *(Specify)* _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER *(Specify)*: _____

[0][7] CM. LENGTH [1][0] MM. WIDTH

12. GLUMES AT MATURITY:

[2] Length: 1 = SHORT *(CA. 7 mm.)* 2 = MEDIUM *(CA. 8 mm.)* 3 = LONG *(CA. 9 mm.)*

[1] Width: 1 = NARROW *(CA. 3 mm.)* 2 = MEDIUM *(CA. 3.5 mm.)* 3 = WIDE *(CA. 4 mm.)*

[4] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[1] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[3] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[2] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[4] Phenol reaction *(See instructions)*: 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER *(Specify)* _____

[0][6] MM. LENGTH [0][3] MM. WIDTH [3][1] GM. PER 1000 SEEDS

17. SEED CREASE:

[2] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[2] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST *(Races)* _____ [2] LEAF RUST *(Races)* _____ [0] STRIPE RUST *(Races)* _____ [1] LOOSE SMUT

[0] POWDERY MILDEW [0] BUNT [2] OTHER *(Specify)* soil borne mosaic virus

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID *(Bydv.)* [1] GREEN BUG [0] CEREAL LEAF BEETLE

[ ] OTHER *(Specify)* _____ HESSIAN FLY RACES: [2] GP [2] A [1] B [2] C [1] D [1] E [2] F [1] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Larned	Seed size	Larned
Leaf size	Larned	Seed shape	Larned
Leaf color	Plainsman V	Coleoptile elongation	Plainsman V
Leaf carriage	Larned	Seedling pigmentation	Larned

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. *(See attachment.)*

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

Botanical Classification: NORKAN

I. Plant Characters:

1. Maturity: medium

2. Height: midtall

3. Growth habit: winter

II. Stem Characters:

1. Color: white

2. Strengh: midstrong

3. Hollowness: hollow

III. Leaf Characters:

1. Leaf hairs: distincly pubecent on abaxial surfaces. hairs are sparse and short, up to 0.5 mm long

IV. Spike Characters:

1. Awnedness: white awns 3-10 cm long

2. Shape: oblong to fusiform

3. Density: middense

4. Position: inclined to erect

V. Glume Characters:

1. Color: white

2. Length: midlong

3. Width: narrow

VI. Shoulder Characters:

1. Width: narrow

2. Shape: wanting at basal glumes approaching square at midspike and ranging to apiculate at the top of the spike

VII. Beak Characters:

1. Width: narrow

2. Shape: acuminate

3. Length: 1-4 mm

VIII. Kernel Characters:

1. Color: red

2. Length: midlong

3. Texture: hard

4. Shape: elliptical to ovate

IX. Germ Characters:

1. Size: small

X. Crease Characters:

1. Width: midwide

2. Depth: middeep

XI. Cheek Characters:

1. Shape: angular

XII. Brush Characters:

1. Size: midsized

2. Length: midlong

3. Collar: no collar

Exhibit D. Additional Description of Norkan

Norkan is an increase of an F4 plant row selected from the cross plainsman V/3/2*(KS76H3705) Larned/Eagle//Sage. The cross was made at Hays, KS the winter of 1976-77 by the late Dr. R.W. Livers. The F4 plant row was grown and selected at Hays in 1981. Norkan was tested in Kansas preliminary yield tests in 1982 and in Kansas advanced nurseries from 1983 to 1986. It was evaluated in the Southern Regional Performance Nursery in 1985 and 1986. Norkan is best adapted to Northern Kansas.

Norkan is an awned, white-glumed semidwarf hard red winter wheat cultivar. It is slightly shorter than Newton and has a coleoptile equal to Newton. Norkan is medium to medium-late in maturity, heading about one day later than Newton. Its winterhardiness has been equal to Scout 66 in the Uniform Winterhardiness Nurseries from 1983 to 1985.

Norkan's inclined white chaffed spikes with fairly long awnes and the distinctly pubescent upper leaf surface are identifying characters.

Norkan carries resistance to leaf rust (Lr24), stem rust (Sr24), soilborne Mosaic Virus, and Hessian fly (H3). It is susceptible to wheat spindle streak mosaic virus.

Hard wheat milling and baking qualities of Norkan are very similar to Eagle. Based on the 1985 evaluation by the Wheat Quality Council, Norkan was not significantly different from Eagle with exception of a slightly lower loaf volume and better crumb color. (Appendix C) Norkan's grain protein has been equal to Eagle and Arkan and 1% higher than Newton.

Three years summaries for yield, test weight, and grain protein content are presented in table 1.

Coleoptile Length: Data presented were collected using a standard coleoptile test procedure developed by the late Dr. R. W. Livers. Values are expressed as % of Eagle and all seed came from the same nursery, grown at Hays, KS in 1985 and 1986.

	1985	1986	AVG
Norkan	85	85	85
Newton	84	85	85
Eagle	100	100	100
Arkan	111	112	112
LSD .05	5.3	4.9	

Winterhardiness: Average survival of Norkan in the 1983 to 1985 USDA, ARS Uniform Winterhardiness Nurseries was 66% as compared to 69, 67, and 58% for Warrior, Scout, and Vona respectively. Data collected in Kansas tests indicate Norkan is equal in winterhardiness to Scout.

Disease and Insect Resistance:

Leaf Rust - Norkan carries resistance to leaf conditioned by Lr24 and Lr1 as verified by the USDA, ARS Leaf Rust Lab at KSU.

Stem Rust - Norkan has been very resistant to stem rust in Kansas. The cereal rust lab at Minnesota has verified the presence of Sr24, but Norkan probably has additional genes derived from Scout.

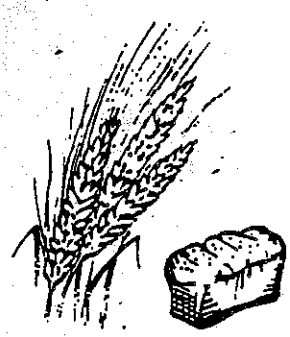
Wheat Soilborne Mosaic Virus - Norkan is rated resistant based on at least 5 years of testing in soilborne mosaic virus infested locations in Southcentral Kansas. It has also been tested in the Uniform Wheat Soilborne Mosaic Nurseries.

Hessian Fly - Norkan carries the H3 gene, derived from Larned, for fly resistance. The presence of H3 in Norkan has been verified by the USDA, ARS Hessian fly lab at KSU.

Table 1. Yield, test weight, and protein content of Norkan compared to four check cultivars in Kansas for 1983 to 1985.

Cultivar	Bu/A Western KS*	Bu/A Eastern KS**	Test*** Weight	Protein*** (%)
Norkan	66	52	58.7	12.8
Newton	61	46	57.0	11.9
Arkan	64	54	58.0	12.8
TAM 107	63	54	56.5	11.7
Larned	60	49	58.2	12.3

* Northern KS locations include Colby, Hays, Belleville, Manhattan, and Powhattan.
** Southern KS locations include Garden City, St. John, Hutchinson, Oxford, Caldwell and Parsons.
***Includes data from all locations and protein adjusted to 12% moisture.



"Better Wheat Makes It Better For All"

WHEAT QUALITY COUNCIL

Professional Bldg. – 404 Humboldt, Suite G
MANHATTAN, KANSAS 66502
Phone 913/ 776-6348
Thomas C. Roberts, Executive Vice-President

A COORDINATED EFFORT OF THE AGRI-BUSINESS AND BAKING INDUSTRY FOR THE IMPROVEMENT OF HARD WINTER WHEAT

WHEAT QUALITY COUNCIL

This is the 36th year for the Large Scale Milling and Baking Evaluation Program. It was initiated by what is now known as the Kansas State University Department of Grain Science and Industry. It has served the very useful purpose of communication between the persons responsible for breeding grain, those that mill the wheat and those that bake the flour into bread.

Wheat quality may have different meanings to us depending on how we utilize the wheat cultivars or the products of their production. The combined efforts of those interested in wheat quality improvement over the years, however, has been of benefit to all segments of the industry.

The Wheat Quality Council has played an important role in improving wheat quality in the hard red winter wheat region. The council's program has encouraged the development of wheat cultivars that perform well because of their desirable quality characteristics.

Flours from 8 large and 9 small scale samples were sent to approximately 35 cooperators for baking. Those cooperators include; mill control chemists, bakery chemists, state and federal wheat quality testing chemists, commercial laboratories and commercial breeding chemists.

Their results are collected and prepared in a preliminary report, which is used at an annual meeting for evaluation of quality. This meeting includes representatives of the many disciplines working on wheat. A 36th final report is to be distributed, giving the findings of the Wheat Quality Council Program.

Membership subscriptions are accepted by and made available from the Council's office location at the Professional Building, Suite G, 404 Humboldt, Manhattan, Kansas 66502.

The Wheat Quality Council is a non-profit organization whose purpose is to guide a coordinated effort of the Agri-Business and Baking Industry in charitable, educational and research efforts of wheat improvement, conservation and protection. Funds for this program of public relations throughout the west central high plains, hard winter wheat producing area come entirely from fees and dues paid by members and cooperators. The affairs of the Council are under the supervision of the Executive Vice-President and the Board of Trustees. The Board consists of representatives from various interest groups who support the Council.

Wheat Quality Council
1985 Wheat Quality Research Summary
Large- and Small-Scale Milling and Baking

1985 was the 36th year for the Large-Scale Milling and Baking Evaluation program. This program has helped the communication system between the persons responsible for breeding wheat and those who mill the grain and bake the flour into bread. This activity is sponsored by the Wheat Quality Council, which serves in a liaison and advisory role.

There were 8 cultivars tested in large-scale tests (23 bushels of wheat) and 9 cultivars tested in the small test (3 bushels of wheat). All samples were grown and submitted by the developing experiment stations to the Kansas State University Department of Grain Science and Industry for the grains' physical, milling and flour data.

The flours were sent to 34 cooperators for baking. These cooperators included cereal chemists from mills, bakeries, state, federal and commercial laboratories in the United States and Canada.

Preliminary data for wheat and flours performance were present in a tentative report at the cooperators meeting, February 6, 1986 in Wichita, Kansas. Each cultivar's milling and baking performance was evaluated for presentation in the 36th Annual Report - The 1985 Wheat Quality Council.

Large-Scale

Kansas

Four entries were evaluated. Eagle was used as the standard variety control. All had relatively good physical properties. Milling properties were good. The Eagle control was considered to be below historical values in baking performance. Experimental sample KS831957 (Sumner), with flour protein two percent above the control, received an overall baking rating poorer than the control primarily because of open grain and slightly weak texture. Several cooperators felt that this variety, with its increased protein level, strong mixing requirements and good mixing tolerance, would be used as a blending wheat. Experimental sample KS82H144 (Dodge) had slightly lower bake absorption than the control with very pliable dough, good machining properties, good loaf volume and close and uniform crumb grain. Experimental sample KS82H4 (Norkan) showed overall bread baking quality similar to that of the control, except for loaf volume which was significantly lower.

NAPB AgriPro

Four entries were evaluated. Newton was used as the standard variety control. All had relatively good physical properties. Milling properties were good. The Newton control was considered to be below historical values in baking performance with lower protein flour. The variety Stallion was comparable in all tests with the control. The variety Thunderbird was better than the control, having significantly higher bake absorption and loaf volume. The variety Victory had significantly higher bake absorption with significantly lower loaf volume, mixing time, grain, texture and overall baking quality than the control.

1985 Kansas Varieties

Three new varieties, Sumner, Dodge and Norkan, have been released by the Kansas Agricultural Experiment Station to farmers for planting in the fall of 1986. They were submitted with the check variety Eagle.

Sumner

Sumner is an early, brown-chaffed, semi-dwarf hard red winter wheat with good yield potential, especially under stress conditions. Sumner's main contributions to new varietal development are its unusually high grain protein content compared to available varieties, favorable test weight and kernel size distribution patterns and its resistance to Spindle Streak Mosiac Virus. Generally, Sumner has performed better than Newton and equal to TAM 107. Its performance is good enough for the entire state; however, its strongest area of adaptation is in south central-southeastern Kansas because of its early maturity and good test weight patterns.

Sumner has good resistance to Soil Borne Mosiac Virus and Spindle Streak Mosiac Virus, moderate resistance to leaf rust, is moderately susceptible to powdery mildew, Septoria, Cephalosporium Stripe and Hessian fly and is susceptible to Tan Spot and stem rust.

WQC - KS831957 - Sampled in 1984 & 1985 - 84-715 & 85-802

Dodge

Dodge is a medium-early white chaffed, semi-dwarf hard red winter wheat with good yield potential for the southern two-thirds of western Kansas. Dodge is usually about 2 inches shorter than Newton, has coleoptile length equal to Eagle and is about 1 1/2 days earlier than Newton and has about the same level of winter hardiness.

Dodge has effective levels of resistance to leaf rust, stem rust, Septoria Leaf Blotch and Soil Borne Mosaic Virus. It is susceptible to Hessian fly. The protein content of Dodge has averaged .5 to 1.0 percentage points higher than Arkan and Eagle.

WQC - KS82H144 - Sampled in 1984 & 1985 - 84-718 & 85-803

Norkan

Norkan is a medium maturity white chaffed, semi-dwarf hard red winter wheat with good yield potential for the northern third of Kansas. Norkan carries resistance to Soil Borne Mosaic Virus, leaf rust, stem rust and Hessian fly. Norkan is slightly shorter than Newton has coleoptile length equal to Newton and is about one day later than Newton. The protein content of Norkan has averaged about one percentage point higher than Newton, which makes it comparable to Eagle and Arkan.

WQC - KS82H4 - Sampled in 1984 & 1985 - 84-717 & 85-804

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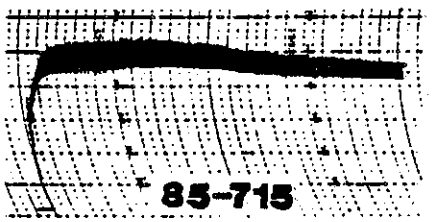
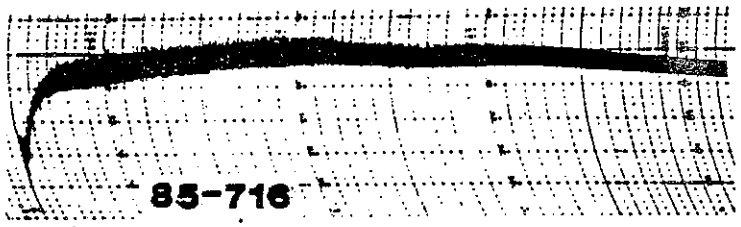
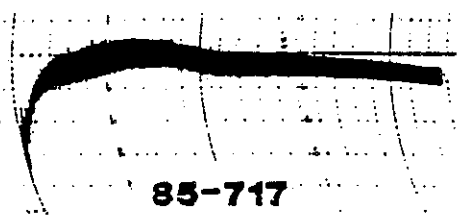
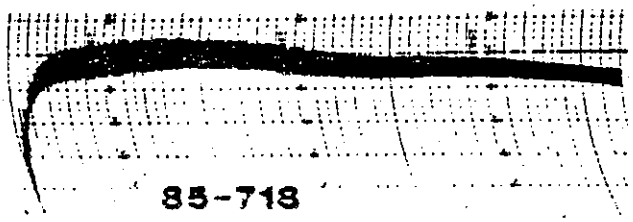
LOCATION HAYS

	EAGLE	SUMNER	DODGE	NORKAN
Code No.	85-715	85-716	85-717	85-718
Variety	Check	KS 831957	KS 82H144	KS 82H4
Wheat Data				
U.S. Bushel Weight (lbs.)	61.4	62.5	63.3	62.6
Hectoliter Weight (kg)	79.08	80.50	81.53	80.63
1000 Kernel Weight (G) (14% M.B.)	32.90	32.55	39.12	33.23
Density (g/cc)	1.455	1.463	1.444	1.455
Pearling Value	65.5	58.0	53.5	62.5
Overs 7W (%)	67.3	56.9	86.8	68.9
9W (%)	32.1	43.0	13.0	30.6
12W (%)	.6	.1	.2	.5
Theoretical Yield (%)	76.34	75.84	77.33	76.42
Protein (14% M.B. & N x 5.7)	11.77	14.97	12.54	13.25
Ash (%) (14% M.B.)	1.61	1.61	1.52	1.51
Straight Grade Flour Data				
Extraction %	70.55	67.10	71.90	71.40
Protein % (14% M.B.)	10.73	14.09	11.69	11.98
Ash % (14% M.B.)	.443	.417	.406	.445
Farinograph Data				
Arrival Time, Min.	1.5	6.0	3.0	2.0
Peak Time, Min	7.0	16.0	6.5	9.0
Stability, Min.	10.5	24	8.5	16.0
M.T.I.	30	30	40	20
Absorption, %	59.2	64.8	60.6	62.2
Valorimeter	67	92	66	76







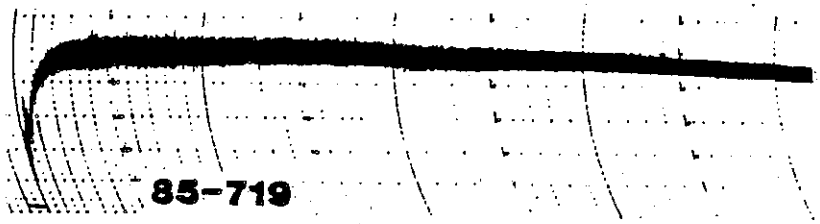


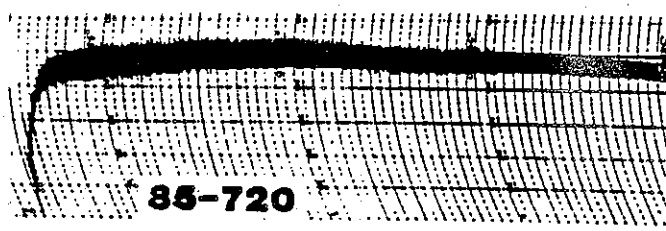
23

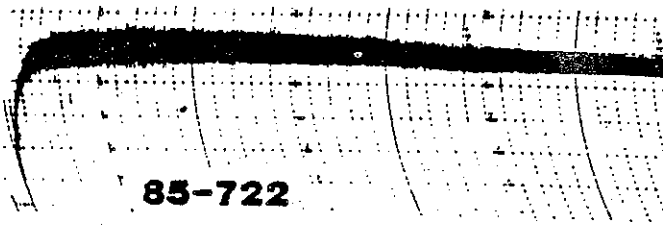
8800033

LOCATION GARDEN CITY

	EAGLE	SUMNER	DODGE	NORKAN
Code No.	85-719	85-720	85-721	85-722
Variety	Check	KS 831957	KS 82H144	KS 82H4
Wheat Data				
U.S. Bushel Weight (lbs.)	57.8	60.0	59.8	57.9
Hectoliter Weight (kg)	74.45	77.28	77.02	74.58
1000 Kernel Weight (G) (14% M.B.)	25.65	28.02	27.32	25.17
Density (g/cc)	1.456	1.446	1.446	1.443
Pearling Value	69.5	64.5	64.5	69.5
Overs 7W (%)	36.0	47.1	53.7	33.0
9W (%)	61.2	51.5	43.9	63.3
12W (%)	2.8	1.4	2.4	3.7
Theoretical Yield (%)	74.66	75.29	75.57	74.47
Protein (14% M.B. & N x 5.7)	14.05	14.49	13.52	13.77
Ash (%) (14% M.B.)	1.71	1.62	1.63	1.70
Straight Grade Flour Data				
Extraction %	69.80	68.70	70.43	70.29
Protein % (14% M.B.)	12.65	13.76	12.67	12.57
Ash % (14% M.B.)	.504	.455	.426	.475
Farinograph Data				
Arrival Time, Min.	2.0	3.0	3.0	1.5
Peak Time, Min	14.0	14.5	7.5	6.5
Stability, Min.	29.0	26.5	16.0	28.0
M.T.I.	10	20	20	10
Absorption, %	61.6	63.4	61.2	61.0
Valorimeter	88	88	70	70





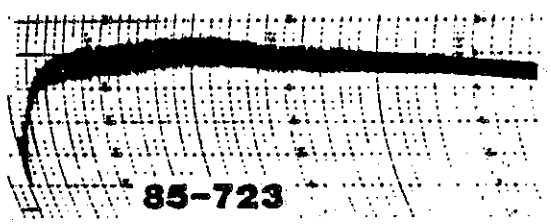


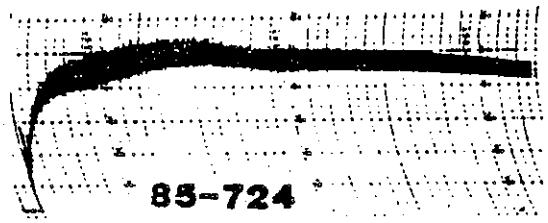
24

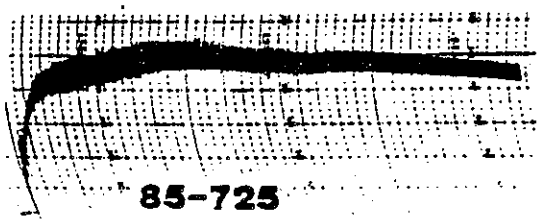
LOCATION COLBY

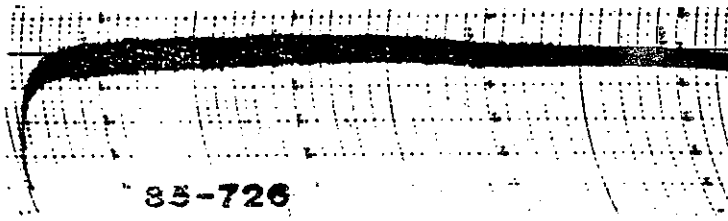
8800033

Code No. / Variety	EAGLE 85-723 Check	SUMNER 85-724 [illegible] 831957	DODGE 85-725 KS 82H144	NORKAN 85-726 KS 82H4
Wheat Data				
U.S. Bushel Weight (lbs.)	60.1	60.5	60.1	58.8
Hectoliter Weight (kg)	77.41	77.92	77.41	75.73
1000 Kernel Weight (G) (14% M.B.)	33.37	34.19	32.30	27.20
Density (g/cc)	1.434	1.431	1.426	1.441
Pearling Value	59.5	52.0	48.5	61.0
Overs 7W (%)	67.1	54.3	67.8	32.8
9W (%)	32.6	45.4	31.6	65.2
12W (%)	.3	.3	.6	2.0
Theoretical Yield (%)	76.34	75.70	76.36	74.54
Protein (14% M.B. & N x 5.7)	13.43	14.63	14.24	13.59
Ash (%) (14% M.B.)	1.62	1.61	1.51	1.61
Straight Grade Flour Data				
Extraction %	70.5	[illegible]	72.25	70.40
Protein % (14% M.B.)	12.43	[illegible]	13.18	12.64
Ash % (14% M.B.)	.464	.434	.396	.444
Farinograph Data				
Arrival Time, Min.	3.0	4.5	5.0	2.5
Peak Time, Min	10.5	9.5	10.5	14.0
Stability, Min.	19	16.5	17.0	32.5
M.T.I.	30	40	40	5
Absorption, %	63.0	64.6	62.0	61.8
Valorimeter	80	78	80	88



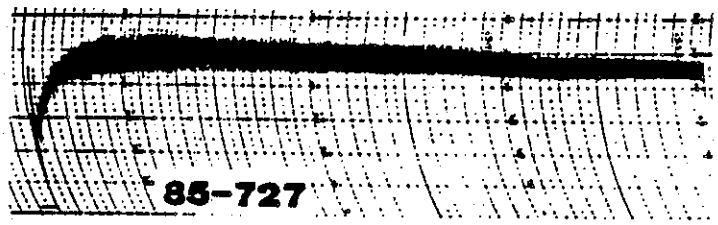


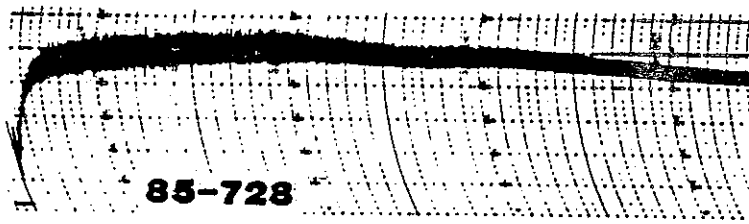


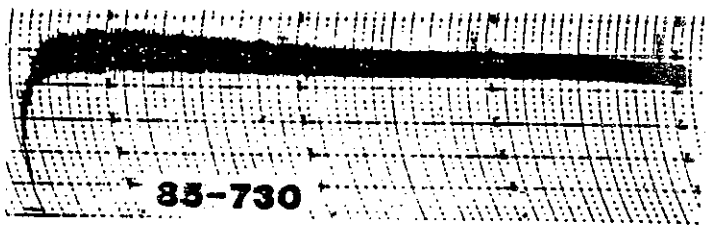


LOCATION HESSTON

	EAGLE	SUMNER	DODGE	NORKAN
Code No.	85-727	85-728	85-729	85-730
Variety	Check	KS 831957	KS 82H144	KS 82H4
Wheat Data				
U.S. Bushel Weight (lbs.)	55.2	62.1	59.1	59.7
Hectoliter Weight (kg)	71.10	79.98	76.12	76.89
1000 Kernel Weight (G) (14% M.B.)	23.47	32.04	27.99	26.13
Density (g/cc)	1.437	1.417	1.434	1.440
Pearling Value	70.0	55.0	58.5	66.0
Overs 7W (%)	16.5	57.9	43.2	22.7
9W (%)	80.6	41.9	55.1	74.7
12W (%)	2.9	.2	1.7	2.6
Theoretical Yield (%)	73.68	75.89	75.08	74.01
Protein (14% M.B. & N x 5.7)	14.35	14.75	13.37	13.11
Ash (%) (14% M.B.)	1.63	1.52	1.64	1.82
Straight Grade Flour Data				
Extraction %	68.40	67.90	69.70	70.80
Protein % (14% M.B.)	13.31	14.30	12.60	12.10
Ash % (14% M.B.)	.493	.404	.403	.443
Farinograph Data				
Arrival Time, Min.	2.5	2.5	3.0	1.5
Peak Time, Min	7.5	14.0	6.0	7.0
Stability, Min.	22	26.5	12.0	28.5
M.T.I.	20	20	20	30
Absorption, %	60.0	63.0	57.6	57.6
Valorimeter	72	88	64	70







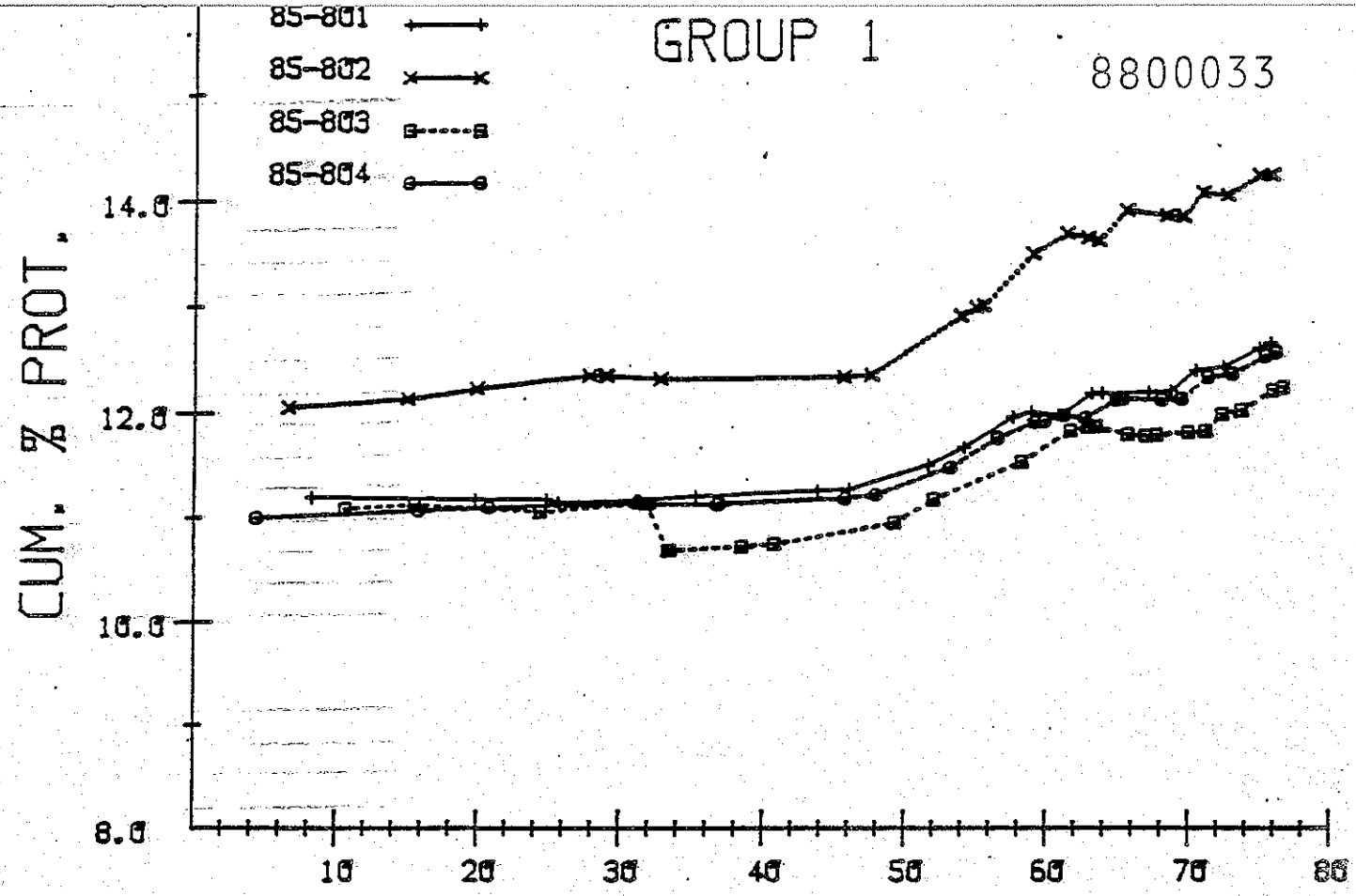
26

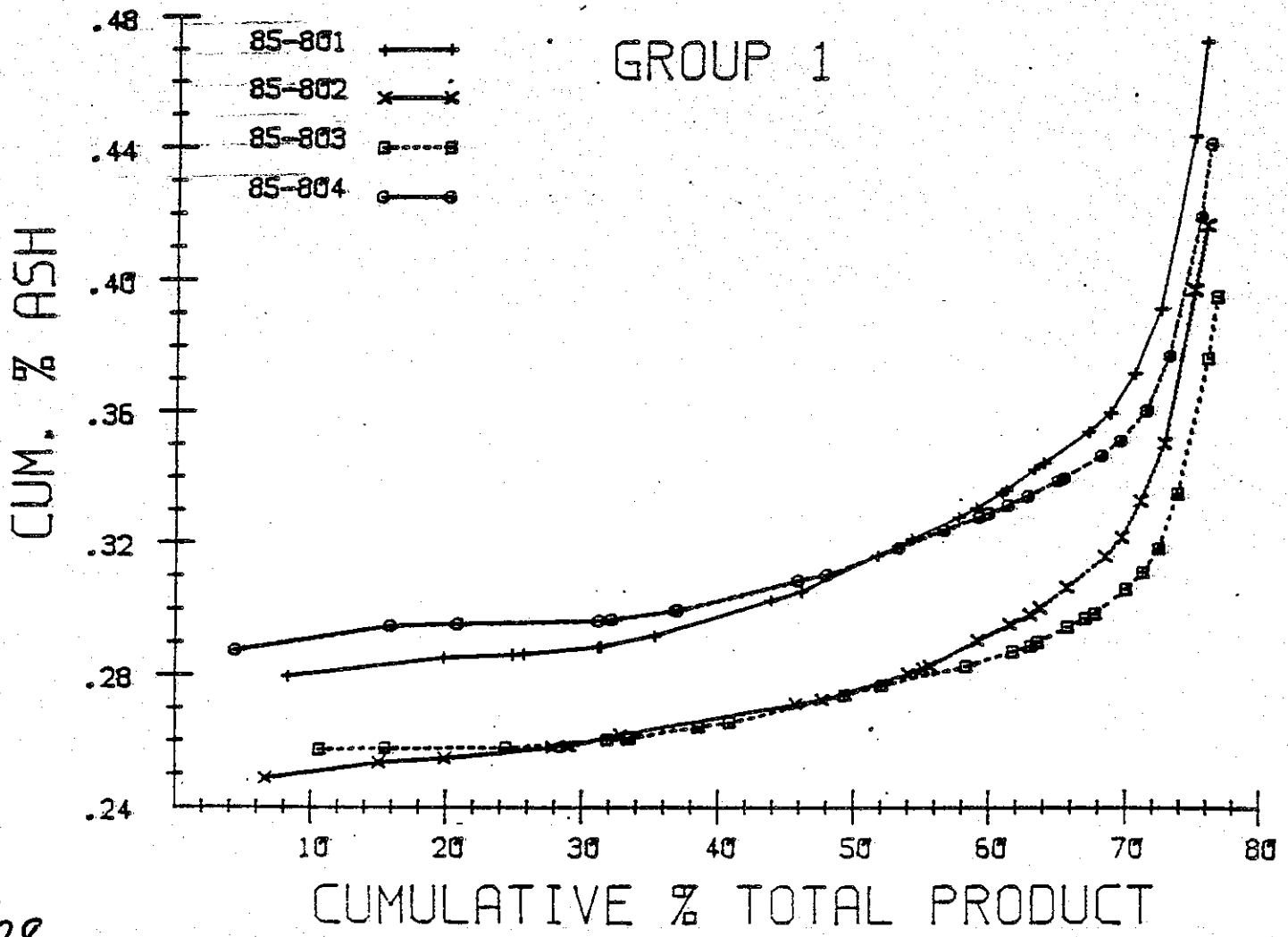
KANSAS

88000033

GROUP 1	EAGLE	SUMNER	DODGE	NORK
Code No.	85-801	85-802	85-803	85-80
Wheat Data				
U.S. Bushel Weight (lbs.)	60.2	62.1	61.7	61.0
Hectoliter Weight (kg)	77.54	79.98	79.47	78.5
1000 Kernel Weight (g) (14% M.B.)	29.85	31.48	30.56	27.3
Density (gm/cc)	1.406	1.422	1.431	1.4
Overs 7W (%)	48.7	50.2	56.7	41.7
9W (%)	49.7	49.1	41.9	55.9
12W (%)	1.6	.7	1.4	2.4
Theoretical Yield (%)	75.34	75.47	75.75	74.9
Sedimentation (14% M.B.) Zeleny	63.2	70.7	66.7	67.7
SDS	53	64	50	56
Protein (%) (14% M.B. & N x 5.7)	13.34	14.77	13.45	12.9
Ash (%) (14% M.B.)	1.64	1.63	1.63	1.6
Milling Data - Cal. Grades				
Straight Grade Extraction (%)	78.85	75.96	76.70	76.2
Ash (% 14% M.B.)	.472	.416	.395	.4
Protein (% - 14% M.B.)	12.66	14.25	12.72	12.5
Patent (%)	53.72	69.29	72.56	54.4
Ash (%)	.320	.320	.320	.3
Protein (%)	11.65	13.86	12.51	11.6
Remaining Clear (%)	22.13	6.67	4.14	21.7
Ash (%)	.841	1.418	1.704	.7
Protein (%)	15.11	18.29	16.45	15.0
Millfeed (%)	24.15	24.04	23.30	23.8
Straight Grade Flour Data				
Protein (%) (14% M.B.)	12.31	14.47	13.19	12.3
Ash (%) (14% M.B.)	.473	.439	.410	.4
Glutomatic (wet)	31.70	36.98	35.61	33.4
Glutomatic (dry)	13.30	15.44	14.11	12.6
Agtron Color (green)	57	62	66	64
Starch Damage (Modified AACC)	7.00	6.23	5.61	6.3
Falling Number (Sec.) Untreated	662	652	509	660
Average Micron Size				
Fisher S.S.S.	19.73	16.97	18.47	19.4
M.S.A. Sedimentation	54	58	65	63
% Between 17 & 35 Microns	19.0	16.5	17.0	16.5

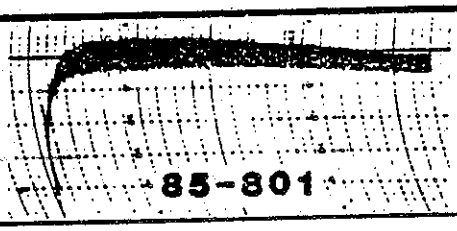
27

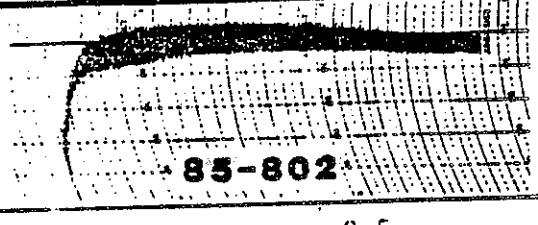

85-801
85-802
85-803
85-804
GROUP 1
8800033
CUM. % PROT.
14.0
12.0
10.0
8.0
10
20
30
40
50
60
70
80


85-801
85-802
85-803
85-804
GROUP 1
CUM. % ASH
.48
.44
.40
.36
.32
.28
.24
10
20
30
40
50
60
70
80
CUMULATIVE % TOTAL PRODUCT

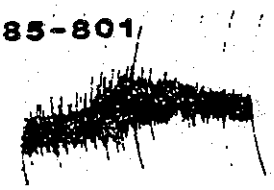
28

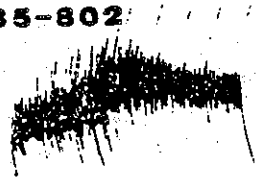
GROUP 1



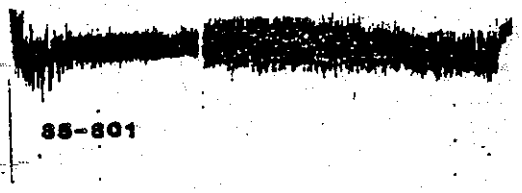


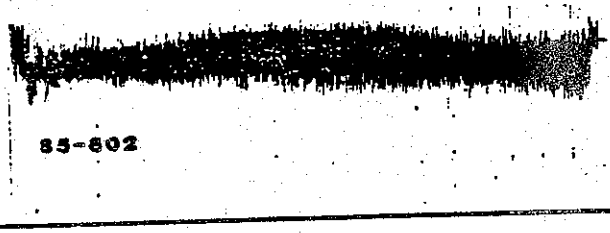
FARINOGRAM	Arrival Time, min.	2.0	2.5
	Peak Time, min.	8.0	10.0
	MTI	40	30
	Valorimeter	72	78
	Absorption, %	60.8	61.2
	Stability, min.	18.0	21.5





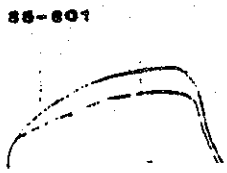
MIXOGRAM	Point of Minimum Mobility Peak Time, min.	4 1/2	4 3/8

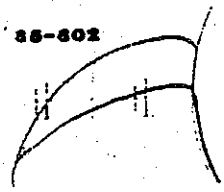




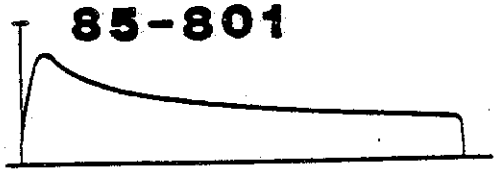
RHEOGRAM	Absorption, %	62.0	62.0
	Fatigue Time, min.	33.1	39.1

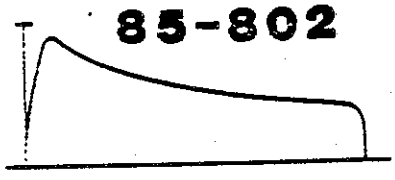
Time:
45 min. (lower)
135 min. (upper)



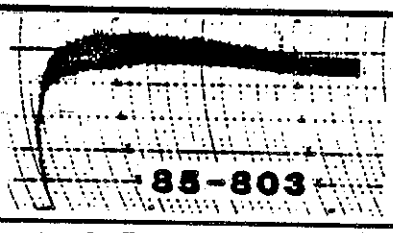
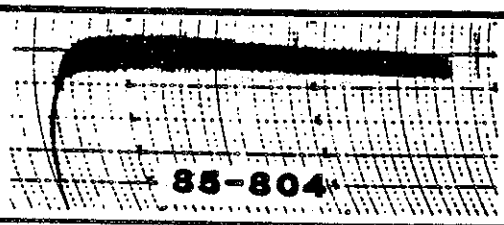
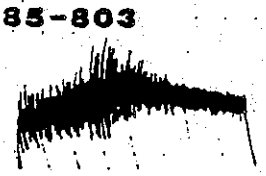
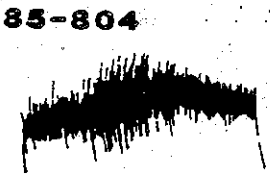
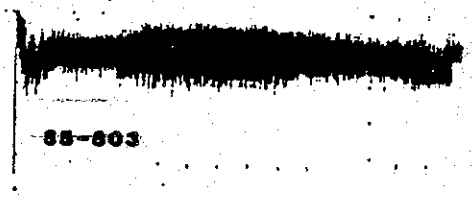
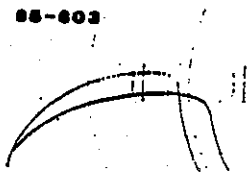
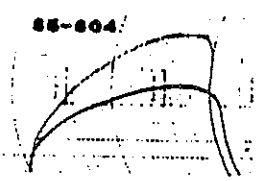
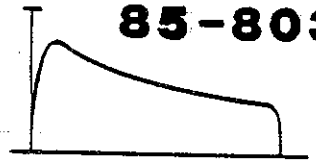
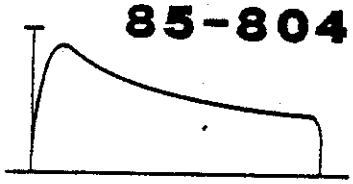


EXTENSIGRAM	Data: (135 min. curve)		
	Area - cm^2	158.03	219.30
	Resis. - 5 cm B.U.	260.0	460.0
	Resis. Peak B.U.	560.0	840.0
	Extensibility cm	21.25	20.50





ALVEOGRAM	Resis. x 1.0 mm	[illegible]	81.6
	Alveo. Area cm^2	[illegible]	42.45
	Extensibility, mm	[illegible]	131.00
	W, x 10^3 ergs	[illegible]	404.12

		DODGE 85-603	NORKAN 85-804
			
FARINOGRAM	Arrival Time, min.	2.0	2.0
	Peak Time, min.	6.5	7.5
	MTI	30	20
	Valorimeter	66	70
	Absorption, %	58.4	59.2
	Stability, min.	12.5	19.0
			
MIXOGRAM	Point of Minimum Mobility Peak Time, min.	4	5
			
RHEOGRAM	Absorption, %	62.0	62.0
	Fatigue Time, min.	29.7	42.9
	Time: 45 min. (lower) 135 min. (upper)		
EXTENSIGRAM	Data: (135 min. curve)		
	Area - cm^2	147.1	210.92
	Resis. - 5 cm B.U.	320.0	420.0
	Resis. Peak B.U.	560.0	800.0
	Extensibility cm	19.0	20.0
			
ALVEOGRAM	Resis. x 1.6 mm	70.4	82.0
	Alveo. Area cm^2	28.25	37.64
	Extensibility, mm	95.0	110.0
	W, x 10^3 ERGS	268.34	358.3

BAKING SUMMARY

CODE NO.		HIST. CHECK	CHECK 85-801	SUMNER 85-802	DODGE 85-803	NORKAN 85-804
FLOUR PROTEIN						
very high	5					
	4	3.9	12.31	14.47	13.19	12.37
average	3					
	2					
min. accep.	1					
BAKE ABSORPTION						
very high	5					
	4	3.8	62.78	64.46 ##	61.96 ##	62.58
average	3					
	2					
minimal	1					
LOAF VOLUME						
very high	5					
	4	4.0	2213.6	2283.2 ##	2216.7	2166.9
average	3					
	2					
minimal	1					
DOUGH CHARACTERISTICS						
bucky-tough	5					
strong elastic	4	4.2	3.60	3.98 ##	3.23 #	3.54
medium pliable	3					
mellow-very pliable	2					
weak, short-sticky	1					
BAKE MIXING TIME						
very long	5					
long	4	4.2	3.56	3.94	3.35 #	3.69
medium	3					
short	2					
very short	1					
MIXING TOLERANCE						
excellent tolerance	5					
good tolerance	4	4.2	3.84	3.88	3.38 ##	3.78
average tolerance	3					
poor tolerance	2					
very poor tolerance	1					

\# 0.05 SIGNIFICANTLY DIFFERENT THAN THE CONTROL

\## 0.01 SIGNIFICANTLY DIFFERENT THAN THE CONTROL

BAKING SUMMARY 8800033

CODE NO.		HIST. CHECK	CHECK 85-801	SUMNER 85-802	DODGE 85-803	NORKAN 85-804
CRUMB COLOR						
white	5		3.56	3.14 ##	3.58	3.14 #
creamy-white	4					
creamy	3					
slightly dull	2					
dull grey	1					
GRAIN						
v. close, v. uniform	5	3.8	3.38	2.94 ##	3.46	3.40
close, uniform	4					
slightly open	3					
open	2					
v. open, uneven	1					
TEXTURE						
silky	5	3.9	3.72	3.44	3.64	3.62
sl. silky	4					
sl. silky-harsh	3					
harsh	2					
very harsh	1					
OVERALL BAKING QUALITY						
excellent	5	3.9	3.67	3.46	3.62	3.54
good	4					
med. quality	3					
poor	2					
very poor	1					

 # 0.05 SIGNIFICANTLY DIFFERENT THAN THE CONTROL

0.01 SIGNIFICANTLY DIFFERENT THAN THE CONTROL

NOTE: The historical check values are the averages of the responses of six cooperators based on what they felt the normal characteristics of a particular check variety were. These values are to be used as an index to judge the check for the current year's test.

Flour protein for the check and experimental varieties are actual values. Baked absorptions and loaf volumes are the means of data received from the cooperators that responded.

Exhibit E. Statement of the Basis of Applicant Ownership

The variety for which Plant Variety Protection is hereby sought was developed by the late Dr. R. W. Livers and Dr. T. J. Martin, employees of Kansas State University Experiment Station. By agreement between the employees and Kansas State University Experiment Station, all rights to any invention, discovery, or development made by the employee while employed by Kansas State University Experiment Station, were assigned by Kansas State University Experiment Station with no rights of any kind retained by the employees.

8800033

United States Department of Agriculture

Agricultural Marketing Service

Livestock and Seed Division

Plant Variety Protection Office
National Agricultural Library Building, Rm. 500
Beltsville, MD. 20705

PLANT VARIETY PROTECTION OFFICE

Gentlemen:

Subject: Application No. 8800033
Variety and Kind: Norkan Wheat

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on the Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is waived, except that this waiver shall not apply to breeders seed, foundation seed, labeling requirements, and blending limitations.

It has been agreed that the Certificate should be issued in the name(s) of:

Kansas Agricultural Experiment Station, Kansas State University,

Waters Hall, Manhattan, KS 66506

9/6/88
(Date)

Kurt C Feltner
(Signature)

Associate Director
Kansas Agricultural Experiment Station

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